

Quantitative evaluation of Cloud-based network virtualization mechanisms for IoT

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Abstract

Copyright © 2016 EAI. Integration of the Internet of Things (IoT) with the Cloud may lead to a range of different architectures and solutions. Our efforts in this domain are mainly geared towards making IoT systems available as service-oriented infrastructure. Under Infrastructure-as-a-Service (IaaS) scenarios, network virtualization is a core building block of any solution, even more so for IoT-focused Cloud providers. Enabling mechanisms are required to support virtualization of the networking facilities for IoT resources that are managed by the Cloud. This work describes an approach to network virtualization based on popular off-the-shelf tools and protocols in place of application-specific logic, acting as a blueprint in the design of the Stack4Things architecture, an OpenStack-derived framework to provide IaaS-like services from a pool of IoT devices. We quantitatively evaluate the underlying mechanisms demonstrating that the proposed approach exhibits mostly comparable performance with respect to standard technologies for virtual private networks, or at least good enough for the kind of underlying hardware, e.g., smart boards, whilst still representing a more flexible solution.

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Keywords

Cloud, IoT, Network virtualization, OpenStack, Performance evaluation, Reverse tunneling, VPN

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